



MEMORANDUM

EPA Region 4 Superfund Division
Rockwell International Site

BVSPC Project No. 049093
28 June 2018

To: Shelby Johnston, EPA Task Order COR

From: Jaime Richardson, Black & Veatch Task Order Manager

Reference: EPA Contract EP-S4-09-02, Task Order No. 093
DCN 49093-0105-07-A-02804R0

Subject: Data Validation Report for Sampling Event Beginning 17 May 2018
ENCO Laboratories BB02344 Stage 2b

1.0 Overview

Black & Veatch Special Projects Corp. (Black & Veatch) has reviewed the data for the samples and analyses listed below. The EPA National Functional Guidelines (EPA, 2017a and EPA 2017b) or method specific QC data were used to evaluate the implementation of field and laboratory QC to ensure acceptable results with a Stage 4 Data Validation (EPA, 2009) by Black & Veatch. Where performance criteria are not met, the data is qualified to indicate the degree of confidence in the final result according to data quality indicators of precision, accuracy (bias), representativeness, completeness, comparability, and sensitivity.

The analytical data included for this project number are of sufficient quality and are deemed acceptable for their intended use except where noted below. Commonly used acronyms and abbreviations used during data validation are presented in Attachment 1.

2.0 Verification

The samples reported were collected in accordance with the Black & Veatch Rockwell International Site Sampling and Analysis Plan Volume 1 Quality Assurance Project Plan Revision 1 (Black & Veatch 2018a) and Volume 2 Field Sampling Plan, Revision 1 (Black & Veatch 2018b). Black & Veatch submitted samples from 9 locations (Table 2-1) comprised of 10 samples (Table 2-2) for analysis to the Enco laboratories as indicated in the Chain of Custody (Attachment 2). Types of samples and media include: nine ambient air and one QC sample (Table 2-1). The QC sample submitted includes: one field duplicate of an air matrix. Target analytes utilizing one analytical methods in one data package includes: VOCs according to the analytical method on Table 2-3.

3.0 Validation

3.1 Field QC

Sample Collection

With the exceptions noted below there were no other issues reported with sampling methods, preservation, handling, or hold time.

Field Duplicate

One field duplicate set of an ambient air matrix was submitted for analysis (Table 2-1). The applicable field duplicate detections for each of the sets that had RPDs which did not meet the acceptance criteria are compared in Table 3-1. Only analyte comparisons requiring a J qualifier are summarized below.

Set 1 - R1AA06/R1AA906, Ambient Air

Dichlorodifluoromethane		
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Based on the *Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996*, the RPDs for aqueous samples must be less than or equal to 30% and for solid samples must be less than or equal to 50%. Based on professional judgement a RPD of 30% was used for evaluation of precision for these ambient air matrix samples. Analytes exceeding the performance criteria are J qualified in the primary and secondary samples of duplicate pairs. RPDs were calculated for all analytes with concentrations greater than the MRL in at least one sample. The MRL is used for calculation of the RPD of non-detections if the duplicate sample (primary or secondary) had a detection.

Field Blanks

Field blanks with detections and any associated sample detections are summarized on Table 3-2. Related sample analyte detections below the adjusted RL received an additional final interpreted qualifier of U. Only blank detections and subsequent sample qualifications are summarized below.

Trip Blank

Trip blanks were not collected for this sampling event.

Equipment Rinsate Blank

Equipment blanks were not collected for this sampling event.

Preservative Blank

Preservative blanks were not collected for this sampling event.

3.2 Laboratory QC

Analytical data from a CLP or EPA regional laboratory has received a Stage 4 data validation summarized below and amended with further validation criteria as noted. If applicable, the validation report will include Table 3-3a which summarizes validation qualifiers applied during EPA validation and presented in the data reports (note that final interpreted qualifiers and results with detections but no qualifiers are not included).

Laboratory QC data submitted from subcontracted laboratory will receive a Stage 2B data validation. During the Stage 2B validation the data has been compared to expected QC checks for the specified level of data validation in Section 1.0. If applicable, the Stage 2B validation will include Table 3-3b in which the sample analysis is cross-checked against the necessary validation criteria to identify where no QC check was expected (NA), a QC check is typically expected but there is no data to associate with the samples submitted (ND), QC data is available and does not exhibit any exceptions to acceptance criteria (OK), or QC data that has been submitted for an expected QC check point exhibits a potential conflict with either laboratory internal acceptance criteria, EPA guidelines, or professional judgement for data validation (QC).

QC issues are organized alphabetically by the analytical method reported and only areas where a potential conflict may exist are addressed.

3.2.1 VOA:EPA TO-15 (VOCs), Air

No issues were observed in the evaluation of these samples.

Tables

2-1	Sample Summary
2-2	Analysis Methods
2-3	Analysis Types
2-4	Analysis Batches
3-1	Field Duplicate Detections
3-2	Field Blank Detections
3-3a	Data Validation Summary for EPA/CLP (not required for this event)
3-3b	Data Validation Check Sheet for Non-EPA/CLP

Attachments

1. Common Data Validation Definitions
2. Chain of Custody
3. Sample Data Sheets with Additional Interpreted Qualifiers
4. Support Documentation (not required for this analytical package)

References

Black & Veatch, 2018a. Black & Veatch Sampling and Analysis Plan Rockwell International Site, Volume 1 Quality Assurance Project Plan. Revision 1, June 2018.

Black & Veatch, 2018b. Black & Veatch Sampling and Analysis Plan Rockwell International Site, Volume 2 Field Sampling Plan, Revision 1. June 2018.

EPA, 1996. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. December 1996.

EPA, 2009. EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005. January 13, 2009.

EPA, 2017a. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, OLEM 9355.0-136, EPA-540-R-2017-002. January 2017.

EPA, 2017b. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OLEM 9355.0-135, EPA-540-R-2017-001. January 2017.

Tables

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TABLE 2-2 ANALYSIS METHODS

SAMPLE ID ¹	SAMPLE DATE	SAMPLE TIME	MATRIX	FIELD QC
R1AA07	17-May-18	8:23	AA	NA
R1AA08	17-May-18	8:30	AA	NA
R1AA09	17-May-18	8:57	AA	FD1SET1
R1AA906	17-May-18	9:20	AA	FD2SET2
R1AA06	17-May-18	9:21	AA	NA
R1AA03	17-May-18	9:38	AA	NA
R1AA02	17-May-18	9:52	AA	NA
R1AA01	17-May-18	10:05	AA	NA
R1AA04	17-May-18	10:40	AA	NA
R1AA05	17-May-18	10:59	AA	NA
QC Samples	1			
Sample Locations	9			
Grand Total	10			

 Field QC Samples

1 - Samples ordered by date and time the sample was acquired

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID¹	VOA:EPA TO-15	TOTAL	MATRIX	FIELD QC
R1AA01	1	1	AA	NA
R1AA02	1	1	AA	NA
R1AA03	1	1	AA	NA
R1AA04	1	1	AA	NA
R1AA05	1	1	AA	NA
R1AA06	1	1	AA	NA
R1AA07	1	1	AA	NA
R1AA08	1	1	AA	NA
R1AA09	1	1	AA	FD1SET1
R1AA906	1	1	AA	FD2SET2
GRAND TOTAL		10		10

■ - Field QC Samples

1 - Samples ordered by the Sample ID

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
VOCs	VOA:EPA TO-15
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-Dichloroethane
	1,1-Dichloroethene (1,1-Dichloroethylene)
	1,2,4-Trichlorobenzene
	1,2,4-Trimethylbenzene
	1,2-Dibromoethane (EDB)
	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3,5-trimethylbenzene
	1,3-Butadiene
	1,3-dichlorobenzene
	1,4-dichlorobenzene
	1,4-dioxane
	2,3,4-Trimethylpentane
	2-Hexanone
	3-chloropropene
	4-ethyltoluene
	4-methyl-2-pentanone
	acetone
	Benzene
	benzyl chloride
	bromodichloromethane
	bromoform
	bromomethane
	Carbon disulfide
	carbon tetrachloride
	chlorobenzene
	chloroethane
	Chloroform
	chloromethane
	cis-1,2-Dichloroethene
	cis-1,3-Dichloropropene
	cyclohexane
	dibromochloromethane
	dichlorodifluoromethane
	ethyl acetate
	Ethyl Benzene
	heptane
	hexachlorobutadiene
	Methyl T-Butyl Ether (MTBE)
	methylene Chloride
	Propene
	Styrene
	Tetrachloroethene (Tetrachloroethylene)
	Tetrahydrofuran
	toluene
	Total Xylenes
	trans-1,2-Dichloroethene
	trans-1,3-Dichloropropene

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
	Trichloroethene (Trichloroethylene)
	trichlorofluoromethane (Freon 11)
	UNMATCHED
	vinyl acetate
	vinyl chloride

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID	METHOD	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
	BATCH ¹ LAB ID							
	VOA:EPA TO-15	22-May-18	17:38					
	8E22007	22-May-18	17:38					
R1AA01	BB02344-01RE1	22-May-18	18:37	21-May-18	10:30	17-May-18	10:05	
R1AA02	BB02344-02	22-May-18	17:38	21-May-18	10:30	17-May-18	9:52	
R1AA03	BB02344-03	22-May-18	19:16	21-May-18	10:30	17-May-18	9:38	
R1AA04	BB02344-04	22-May-18	19:54	21-May-18	10:30	17-May-18	10:40	
R1AA05	BB02344-05	22-May-18	20:33	21-May-18	10:30	17-May-18	10:59	
R1AA06	BB02344-06	22-May-18	21:12	21-May-18	10:30	17-May-18	9:21	
R1AA906	BB02344-07	22-May-18	21:50	21-May-18	10:30	17-May-18	9:20	
R1AA07	BB02344-08	22-May-18	22:29	21-May-18	10:30	17-May-18	8:23	
R1AA08	BB02344-09	22-May-18	23:08	21-May-18	10:30	17-May-18	8:30	
R1AA09	BB02344-10	22-May-18	23:47	21-May-18	10:30	17-May-18	8:57	

1 - Data packages from an EPA or CLP laboratory will not have a batch ID available and will display "(blank)".

C - Chain of Custody issue.

H - Hold time has been exceeded.

QC - Quality Control criteria may require review.

S - Sample acquisition, handling, or shipping issue

T - Temperature issue.

TABLE 2-2 ANALYSIS METHODS

SET 1						
METHOD ANALYTE	PRIMARY		SECONDARY		RPD	QC
	R1AA06		R1AA906		30.0	
	Result	MRL	Result	MRL		
VOA: EPA TO-15						
acetone	5.7	2.4	5.9	2.3	3.4	N/A
Benzene	0.11	0.067	0.12	0.064	8.7	N/A
carbon tetrachloride	0.069	0.042	0.068	0.04	1.5	N/A
chloromethane	0.63	0.083	0.59	0.079	6.6	N/A
dichlorodifluoromethane	0.44	0.064	0.42	0.061	36.8	J
Styrene	0.06	0.05	0.058	0.048	3.4	N/A
toluene	0.12	0.059	0.12	0.057	0.0	N/A
trichlorofluoromethane (Freon 11)	0.23	0.05	0.22	0.048	4.4	N/A

- detection < MRL

▒ - RPD > matrix acceptance criteria

NA - Not analyzed

ND - Not detected

N/A - Not applicable. RPD lower than acceptance criteria, both results lower than the MRL, or

TABLE 2-2 ANALYSIS METHODS

Notes

 - detection < MRL. Analyte pairs in which one is a detect and the other is non-detect or below the reporting limit will use the reporting limit as a substitution for the calculation. Analyte pairs in which both are below the reporting limit will not be calculated.

 - RPD > matrix acceptance criteria

NA - Not analyzed

ND - Not detected

N/A - Not applicable. RPD lower than acceptance criteria, both results lower than the MRL, or TICs.

TABLE 2-2 ANALYSIS METHODS

BLANK SAMPLE	Blank Detection			
RELATED DETECTIONS		Result	MRL	QC
NONE	NO	N/A		
NONE				

QC - Quality Control criteria may require review.

N/A - Not applicable. QC measures not necessary due to lack of detection or detection above the Blank MRL.

NA - Not analyzed.

 - Detection > MRL

 - Detection < adjusted MRL

TABLE 2-2 ANALYSIS METHODS

Analytical Method Batch	Analysis Date	Analysis Time	Tuning	Calibration - Initial	Calibration - Continuing	Instrument Blank	Lab Blank	LCS	Lab Duplicate	Serial Dilution	MS	MSD	DMC	Surrogate	Internal Standard	PE Sample
VOA:EPA TO-15	22-May-18	17:38														
8E22007	22-May-18	17:38	N/A	N/A	N/A	N/A	OK	OK	N/A	N/A	OK	OK	N/A	N/A	N/A	N/A

1 - Typical data validation stages defined in "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use", OSWER No. 9200.1-85, EPA 540-R-08-005. 13 January 2009

N/A - Not Applicable. Data not required or expected for the analysis and a typical Stage 2B Validation¹.

ND - No Data. Typical QC data expected for Stage 2B Validation¹ is not available.

OK - Data available and meets acceptance criteria.

QC - Quality Control. Performance criteria not met and further evaluation or qualification of associated sample data is necessary.

Attachment 1
Common Data Validation Definitions

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Common Data Validation Definitions

%D	percent difference
%R	percent recovery
%RSD	percent relative standard deviation
°C	degrees Celcius
CCV	continuing calibration verification
CLP	Contract Laboratory Program
DMC	deuterated monitoring compound
EPA	United States Environmental Protection Agency
EB	equipment rinsate blank
H ² SO ⁴	sufuric acid
HNO ³	nitric acid
ICAL	initial calibration
ICV	initial calibration verification
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
MDL	minimum detection limit
mg/k	milligrams per kilogram
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
NaOH	sodium hydroxide
PE	performance evaluation
PB	preservative blank
QA	quality assurance
QC	quality control
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
SESD	Science and Ecosystem Support Division
SVOC	semi-volatile organic compounds
SU	standard units
TB	trip blank
TIC	tentatively identified compound
ug/L	micrograms per kilogram
ug/L	micrograms per liter
VOC	volatile organic compounds

Environmental Matrix

AA	ambient air
GW	groundwater
ID	investigative derived waste
SB	subsurface soil
SD	sediment
SF	surface soil
SG	soil gas
SW	surface water

Data Qualifiers

Inorganics

- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J- The result is an estimated quantity, but the result may be biased low.
- J+ The result is an estimated quantity, but the result may be biased high.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
- U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Organics

- C This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS). The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
- J The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- NJ The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
- R The analyte was analyzed for, but was not detected above the level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
- U The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
- UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
- X This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

Attachment 2
Chain of Custody

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ENVIRONMENTAL CONSERVATION LABORATORIES - CHAIN-OF-CUSTODY RECORD

10775 Central Port Dr
Orlando, FL 32824
(407) 859-8314 Fax (407) 850-0943

4810 Executive Park Court, Suite 211
Jacksonville, FL 32216-8089
(904) 236-3037 Fax (904) 236-0210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 457-3000 Fax (919) 467-8515

Client Name Black & Veatch		Project Number		Requested Analyses						Requested Turnaround Times			
Address 1100 Sanctuary Pkwy		Project Name/Desc Rockwell-Air		TD 15 (summa)						Note: Rush requests subject to acceptance by the facility			
City/State Alpharetta, GA 30009		PO # / Billing Info								<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Expedited		Due <u> </u> / <u> </u> / <u> </u>	
Tel 770-751-8159		Reporting Contact Jaime Richardson								Lab Workorder TBB 02344			
Fax		Billing Contact Jaime Richardson											
Sampler(s) Name, Affiliation (Print) Jaime Richardson, Black & Veatch		Sampler(s) Signature <i>[Signature]</i>		Site Location / Time Zone Greensboro, MS		Preservation (See Codes) (Combine as necessary)							

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	Sample Comments
	RIAA01	5/17/18	10:05		A	1	X
	RIAA02	5/17/18	9:52		A	1	X
	RIAA03	5/17/18	9:38		A	1	X
	RIAA04	5/17/18	10:40		A	1	X
	RIAA05	5/17/18	10:59		A	1	X
	RIAA06	5/17/18	9:21		A	1	X
	RIAA06	5/17/18	9:20		A	1	X
	RIAA07	5/17/18	8:23		A	1	X
	RIAA08	5/17/18	8:30		A	1	X
	RIAA09	5/17/18	8:57		A	1	X
						10	← Total # of Containers

Sample Kit Prepared By	Date/Time	Retrieval By	Date/Time	Received By	Date/Time
		<i>[Signature]</i> Black & Veatch	5/17/18 1400	<i>[Signature]</i>	5/21/18 1030
Comments/Special Reporting Requirements		Retrieval By	Date/Time	Received By	Date/Time
Cooler #'s & Temps on Receipt	Condition Upon Receipt				
	<input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable				

Matrix: GW-Groundwater SO-Soil DW-Drinking Water SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments) Preservation: H-HCl H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)

Note: All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist.

Attachment 3

Sample Data Sheets with Additional Interpreted Qualifiers

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ANALYTICAL RESULTS

Description: R1AA06

Lab Sample ID: BB02344-06

Received: 05/21/18 10:30

Matrix: Air

Sampled: 05/17/18 09:21

Work Order: BB02344

Project: Rockwell Air

Sampled By: Jamie L Richardson

% Solids:

Volatile Organic Compounds by GCMS

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,1,1-Trichloroethane [71-55-6]	0.030	U	ppbv	1.56	0.030	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,1,2,2-Tetrachloroethane [79-34-5]	0.037	U	ppbv	1.56	0.037	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,1,2-Trichloroethane [79-00-5]	0.050	U	ppbv	1.56	0.050	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,1-Dichloroethane [75-34-3]	0.030	U	ppbv	1.56	0.030	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,1-Dichloroethene [75-35-4]	0.028	U	ppbv	1.56	0.028	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,2,4-Trichlorobenzene [120-82-1]	0.22	U	ppbv	1.56	0.22	0.78	8E22007	TO-15	05/22/18 21:12	LTS	
1,2,4-Trimethylbenzene [95-63-6]	0.039	U	ppbv	1.56	0.039	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,2-Dibromoethane [106-93-4]	0.044	U	ppbv	1.56	0.044	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,2-Dichlorobenzene [95-50-1]	0.14	U	ppbv	1.56	0.14	0.39	8E22007	TO-15	05/22/18 21:12	LTS	
1,2-Dichloroethane [107-06-2]	0.039	U	ppbv	1.56	0.039	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,2-Dichloropropane [78-87-5]	0.058	U	ppbv	1.56	0.058	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,3,5-Trimethylbenzene [108-67-8]	0.031	U	ppbv	1.56	0.031	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,3-Butadiene [106-99-0]	0.092	U	ppbv	1.56	0.092	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,3-Dichlorobenzene [541-73-1]	0.086	U	ppbv	1.56	0.086	0.39	8E22007	TO-15	05/22/18 21:12	LTS	
1,4-Dichlorobenzene [106-46-7]	0.034	U	ppbv	1.56	0.034	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
1,4-Dioxane [123-91-1]	0.083	U	ppbv	1.56	0.083	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
2,2,4-Trimethylpentane [540-84-1]	0.066	U	ppbv	1.56	0.066	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
2-Butanone [78-93-3]	1.0	U	ppbv	1.56	1.0	3.9	8E22007	TO-15	05/22/18 21:12	LTS	
2-Hexanone [591-78-6]	0.27	U	ppbv	1.56	0.27	0.39	8E22007	TO-15	05/22/18 21:12	LTS	
2-Propanol [67-63-0]	0.44	U	ppbv	1.56	0.44	2.0	8E22007	TO-15	05/22/18 21:12	LTS	
3-Chloropropene [107-05-1]	0.041	U	ppbv	1.56	0.041	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
4-Ethyltoluene [622-96-8]	0.047	U	ppbv	1.56	0.047	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
4-Methyl-2-pentanone [108-10-1]	0.053	U	ppbv	1.56	0.053	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Acetone [67-64-1]	5.7		ppbv	1.56	2.4	3.9	8E22007	TO-15	05/22/18 21:12	LTS	
Benzene [71-43-2]	0.11	I	ppbv	1.56	0.067	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Benzyl chloride [100-44-7]	0.031	U	ppbv	1.56	0.031	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Bromodichloromethane [75-27-4]	0.022	U	ppbv	1.56	0.022	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Bromoethene [593-60-2]	0.044	U	ppbv	1.56	0.044	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Bromoform [75-25-2]	0.041	U	ppbv	1.56	0.041	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Bromomethane [74-83-9]	0.083	U	ppbv	1.56	0.083	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Carbon disulfide [75-15-0]	0.15	U	ppbv	1.56	0.15	0.39	8E22007	TO-15	05/22/18 21:12	LTS	
Carbon tetrachloride [56-23-5]	0.069	I	ppbv	1.56	0.042	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Chlorobenzene [108-90-7]	0.048	U	ppbv	1.56	0.048	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Chloroethane [75-00-3]	0.053	U	ppbv	1.56	0.053	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Chloroform [67-66-3]	0.039	U	ppbv	1.56	0.039	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Chloromethane [74-87-3]	0.63		ppbv	1.56	0.083	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
cis-1,2-Dichloroethene [156-59-2]	0.056	U	ppbv	1.56	0.056	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
cis-1,3-Dichloropropene [10061-01-5]	0.045	U	ppbv	1.56	0.045	0.39	8E22007	TO-15	05/22/18 21:12	LTS	
Cyclohexane [110-82-7]	0.059	U	ppbv	1.56	0.059	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Dibromochloromethane [124-48-1]	0.034	U	ppbv	1.56	0.034	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Dichlorodifluoromethane [75-71-8]	0.44	J	ppbv	1.56	0.064	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Ethyl Acetate [141-78-6]	0.042	U	ppbv	1.56	0.042	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Ethylbenzene [100-41-4]	0.050	U	ppbv	1.56	0.050	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Freon 113 [76-13-1]	0.082	I	ppbv	1.56	0.023	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Freon 114 [76-14-2]	0.069	U	ppbv	1.56	0.069	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Heptane [142-82-5]	0.067	U	ppbv	1.56	0.067	0.20	8E22007	TO-15	05/22/18 21:12	LTS	
Hexachlorobutadiene [87-68-3]	0.072	U	ppbv	1.56	0.072	0.20	8E22007	TO-15	05/22/18 21:12	LTS	

ANALYTICAL RESULTS

Description: R1AA906

Lab Sample ID: BB02344-07

Received: 05/21/18 10:30

Matrix: Air

Sampled: 05/17/18 09:20

Work Order: BB02344

Project: Rockwell Air

Sampled By: Jamie L Richardson

% Solids:

Volatile Organic Compounds by GCMS

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,1,1-Trichloroethane [71-55-6]	0.028	U	ppbv	1.49	0.028	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,1,2,2-Tetrachloroethane [79-34-5]	0.036	U	ppbv	1.49	0.036	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,1,2-Trichloroethane [79-00-5]	0.048	U	ppbv	1.49	0.048	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,1-Dichloroethane [75-34-3]	0.028	U	ppbv	1.49	0.028	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,1-Dichloroethene [75-35-4]	0.027	U	ppbv	1.49	0.027	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,2,4-Trichlorobenzene [120-82-1]	0.21	U	ppbv	1.49	0.21	0.74	8E22007	TO-15	05/22/18 21:50	LTS	
1,2,4-Trimethylbenzene [95-63-6]	0.037	U	ppbv	1.49	0.037	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,2-Dibromoethane [106-93-4]	0.042	U	ppbv	1.49	0.042	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,2-Dichlorobenzene [95-50-1]	0.13	U	ppbv	1.49	0.13	0.37	8E22007	TO-15	05/22/18 21:50	LTS	
1,2-Dichloroethane [107-06-2]	0.037	U	ppbv	1.49	0.037	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,2-Dichloropropane [78-87-5]	0.055	U	ppbv	1.49	0.055	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,3,5-Trimethylbenzene [108-67-8]	0.030	U	ppbv	1.49	0.030	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,3-Butadiene [106-99-0]	0.088	U	ppbv	1.49	0.088	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,3-Dichlorobenzene [541-73-1]	0.082	U	ppbv	1.49	0.082	0.37	8E22007	TO-15	05/22/18 21:50	LTS	
1,4-Dichlorobenzene [106-46-7]	0.033	U	ppbv	1.49	0.033	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
1,4-Dioxane [123-91-1]	0.079	U	ppbv	1.49	0.079	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
2,2,4-Trimethylpentane [540-84-1]	0.063	U	ppbv	1.49	0.063	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
2-Butanone [78-93-3]	0.97	U	ppbv	1.49	0.97	3.7	8E22007	TO-15	05/22/18 21:50	LTS	
2-Hexanone [591-78-6]	0.25	U	ppbv	1.49	0.25	0.37	8E22007	TO-15	05/22/18 21:50	LTS	
2-Propanol [67-63-0]	0.42	U	ppbv	1.49	0.42	1.9	8E22007	TO-15	05/22/18 21:50	LTS	
3-Chloropropene [107-05-1]	0.039	U	ppbv	1.49	0.039	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
4-Ethyltoluene [622-96-8]	0.045	U	ppbv	1.49	0.045	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
4-Methyl-2-pentanone [108-10-1]	0.051	U	ppbv	1.49	0.051	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Acetone [67-64-1]	5.9		ppbv	1.49	2.3	3.7	8E22007	TO-15	05/22/18 21:50	LTS	
Benzene [71-43-2]	0.12	I	ppbv	1.49	0.064	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Benzyl chloride [100-44-7]	0.030	U	ppbv	1.49	0.030	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Bromodichloromethane [75-27-4]	0.021	U	ppbv	1.49	0.021	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Bromoethene [593-60-2]	0.042	U	ppbv	1.49	0.042	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Bromoform [75-25-2]	0.039	U	ppbv	1.49	0.039	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Bromomethane [74-83-9]	0.079	U	ppbv	1.49	0.079	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Carbon disulfide [75-15-0]	0.14	U	ppbv	1.49	0.14	0.37	8E22007	TO-15	05/22/18 21:50	LTS	
Carbon tetrachloride [56-23-5]	0.068	I	ppbv	1.49	0.040	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Chlorobenzene [108-90-7]	0.046	U	ppbv	1.49	0.046	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Chloroethane [75-00-3]	0.051	U	ppbv	1.49	0.051	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Chloroform [67-66-3]	0.037	U	ppbv	1.49	0.037	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Chloromethane [74-87-3]	0.59		ppbv	1.49	0.079	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
cis-1,2-Dichloroethene [156-59-2]	0.054	U	ppbv	1.49	0.054	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
cis-1,3-Dichloropropene [10061-01-5]	0.043	U	ppbv	1.49	0.043	0.37	8E22007	TO-15	05/22/18 21:50	LTS	
Cyclohexane [110-82-7]	0.057	U	ppbv	1.49	0.057	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Dibromochloromethane [124-48-1]	0.033	U	ppbv	1.49	0.033	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Dichlorodifluoromethane [75-71-8]	0.42	J	ppbv	1.49	0.061	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Ethyl Acetate [141-78-6]	0.040	U	ppbv	1.49	0.040	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Ethylbenzene [100-41-4]	0.048	U	ppbv	1.49	0.048	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Freon 113 [76-13-1]	0.065	I	ppbv	1.49	0.022	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Freon 114 [76-14-2]	0.066	U	ppbv	1.49	0.066	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Heptane [142-82-5]	0.064	U	ppbv	1.49	0.064	0.19	8E22007	TO-15	05/22/18 21:50	LTS	
Hexachlorobutadiene [87-68-3]	0.069	U	ppbv	1.49	0.069	0.19	8E22007	TO-15	05/22/18 21:50	LTS	

Attachment 4
QC Support Documentation

No additional support necessary for this sample data group

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